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The Concept, Features and Prospects for the Metaverse Construct Development

A.S. Yukhno
Institute of Public Service and Management, RANEPA, Moscow, Russia

ABSTRACT

The paper discusses formation features of the metaverse concept in terms of the active introduction of information and communication technologies (ICT) into the state governance and business. The work' goal is to study the concept content, its structure and development prospects. The author used such general scientific research methods as content analysis, comparative and correlation analysis, grouping, synthesis, systematization. In order to reveal the concept content, the paper reflects various approaches to the definition of the term "metaverse". The author proposes his understanding and analyzes the issues of transition to the Web3 era and its relationship with the metaverse in the digital transformation of society and economy. The research presents a vision of the major elements of the metaverse at the current time. Despite the emerging risks, it assumes the active use of ICT and trends towards decentralization of the economy will contribute to the further implementation of the metaverse concept in our daily life. A practical significance of the research lies in the possibility of using its provisions in the compilation of strategies for the development of corporations and state institutions. As an inference, the study gives some recommendations to corporations on taking part in the creation and it makes development of virtual worlds and a conclusion about the prospects for the concept progress in the medium term.

Keywords: blockchain; virtual and augmented reality; metaverse; smart contracts; cryptocurrencies; non-fungible tokens (NFT); digital economy; web3

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INTRODUCTION

Recent decades have been characterised by widespread adoption of information and communication technologies (hereinafter, ICT) in state and corporate practices and changes in socio-economic processes, many of which are based on new governance principles. This situation is a consequence of the development of the digital economy, where previous models are either ineffective or inhibit actively developing market segments.

The dynamic development of ICT requires corporations to adapt their organisational structures to the new environment and their management systems to new tools and practices. This approach is particularly driven by their ability to effectively address specific challenges while influencing not only corporate business strategy, but also transforming sources of value creation in a short time frame.

In this context, the concept of the metaverse attracts particular attention. M. O. Kanyina and M. Poyan conclude that its formation has an impact on business models of corporations, contributing to new sources of value, establishing "new partnerships and valuable relationships in which the actual competitor may become a future provider of creativity, skills and experience", and expanding the virtual commerce market [1, p. 26]. In 2021, the concept was widely disseminated in public discourse, generating a lively debate about its content and development prospects.

For the purpose of this study, the increased public interest in the issue was analysed by comparing online search query statistics. For this task Google Trends and Yandex Wordstat tools were used to show changes in the content of search queries in different languages in relation to the total volume of search queries. *Fig. 1 and 2* show the number of online search queries for the term "metaverse" in Russian and English from 16 July 2021 to 16 July 2022.

The graphs show an increased search interest in the subject in both the Russian Federation and abroad, which in practice was driven by the announcement of Facebook's renaming to Meta Platforms [1] on 28 October 2021. Meanwhile, according to Google Trends, the next active surge in search queries came in January 2022 and in the Russian-language search engine in February 2022.

To investigate the content of the metaverse concept, it was necessary to:

1. To analyse the approaches to the disclosure of the content of the metaverse concept and its structure, and to formulate the author's definition of the term.

2. To consider the relationship between the concepts of metaverse and Web3 at the current stage of economic development.

3. To formulate recommendations for corporations on their participation in the creation and development of virtual worlds, as well as to outline the prospects of metaverse development.

The author assumes that even taking into account emerging risks, active implementation of information and communication technologies and the trend of economic decentralization will facilitate further integration of the metaverse concept

[1] On March 28, 2022 the Tverskoy District Court of Moscow published a reasoned judgment dated March 21, 2022 prohibiting the activities of the US multinational holding company MetaPlatforms Inc. in selling social networking products of Facebook and Instagram in the Russian Federation on the grounds of carrying out extremist activities. The appellate decision of the Judicial Division for Civil Cases of the Moscow City Court of 20 June 2022 upheld the decision of the court of first instance and the appeal was dismissed. These decisions do not apply to the activities of the company's messengerWhatsApp due to its lack of a public dissemination function. Hereinafter, the use of information about MetaPlatforms Inc. and its resources implies that it violates the requirements of Russian legislation on countering extremist activity. As of June 29, 2022, the ban is still in effect. URL: https://mos-gorsud.ru/rs/tverskoj/services/cases/civil/details/de7ea6a0-a3ab-11ec-8a7e-51b31fb55b35 (accessed on: 29.06.2022).

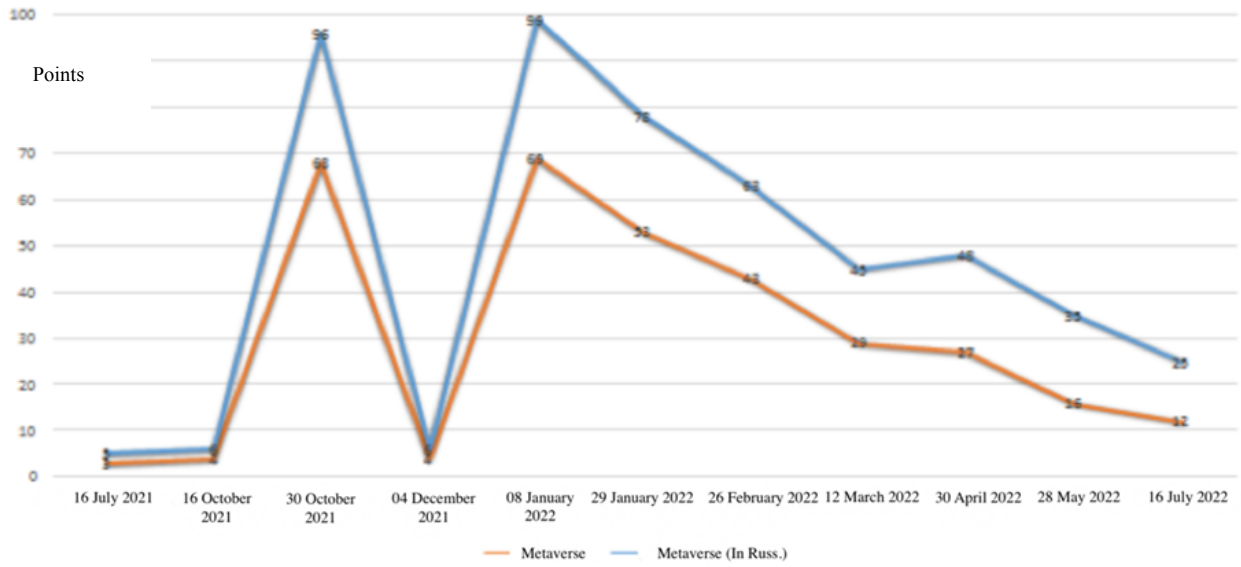

Fig. 1. **Popularity of online search queries for the term "metaverse" (In Russ.) / "metaverse" between 16th July 2021 and 16th July 2022 was performed with Google Trends in points, maximum value = 100**

Source: compiled by the author based on Google Trends.

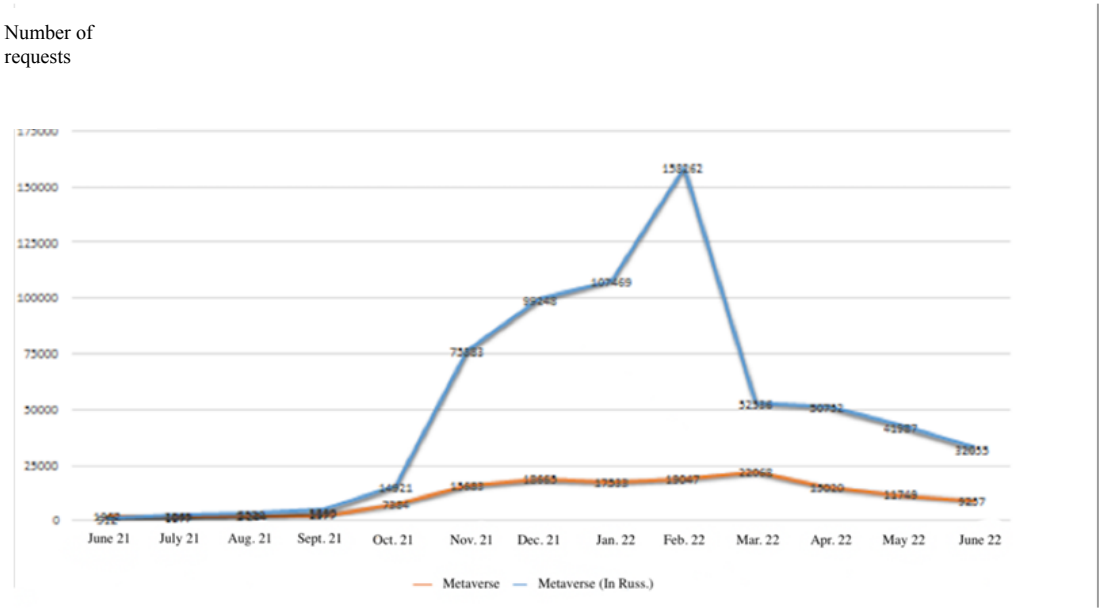

Fig. 2. **Popularity of online search queries for the term "metaverse" (In Russ.) / "metaverse" between 16th July 2021 and 16th July 2022 was performed with Yandex Wordstat by number of queries and requests**

Source: compiled by the author based on Yandex Wordstat.

in our everyday life. However, at the moment, all forecasts of its development cover only individual outlines and do not allow elaborating systematic and reliable models of its functioning.

THE METAVERSE: APPROACHES TO DEFINING CONTENT

The concept of a metaverse involves bringing together all virtual worlds alongside the physical world and ensuring

Table 1

Metaverse features

Characteristics	Description
Consistency	The metaverse never "pauses" or "ends", but simply continues indefinitely
Synchronised and lively interactions	The metaverse assumes a 'lived' (real-life) experience that exists all the time for everyone in real time
No limitations on simultaneous user capacity, and giving each user an individual sense of presence	In the metaverse, everyone can be part of it and share in a particular event (action), but at the same time, in isolation
A functioning economy	In the metaverse, people and businesses will be able to create, own, invest, sell and be rewarded for a wide range of work that produces value recognised by others
Combination of digital and physical worlds, and working on both open and closed platforms	The metaverse combines the possibilities of different worlds and technologies
Unprecedented compatibility	The metaverse ensures compatibility of data, digital items/assets, content, etc.
Контент и опыт	The metaverse contains experiences and content created and managed by a wide range of authors

Sourse: compiled by the author based on URL: https://www.matthewball.vc/all/themetaverse.

their interoperability. Currently, its main attributes are attributed by experts as immersive experience, real-time interactivity, user identification, interoperability across platforms and devices, simultaneous interaction of thousands of people, use directions covering human activities beyond games.[2]

In order to form an idea of the characteristics of the metaverse, one of the proponents of the concept, venture capitalist M. Ball, suggested that seven characteristics of the metaverse should be used in practice (*Table 1*).

Given the lack of a unified terminological framework in this context, the content of the term now needs to be clarified on a case-by-case basis. Approaches to the issue are very diverse and reflect different aspects of its activities (*Table 2*).

The author of this paper understands the metaverse as a sustainable network of permanent immersive virtual worlds connected to the physical world, in which an unlimited number of users interact with each other via digital avatars in real time on a wide range of issues recognised as valuable by other users.

TRANSITION TO THE WEB3 ERA: A NEW PARADIGM OF RELATIONSHIPS

The McKinsey survey on the practical creation of the metaverse and its potential, conducted in 2022, showed interesting results. Although the content of the term is still being understood, the authors of the survey conclude that the transit to the

[2] URL: McKinsey & Company. Value Creation in the metaverse. 2022. https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf P. 11. (accessed on: 05.07.2022).

Table 2

Approaches to the definition of the term "metaverse"

Definition	Sourse
A metaverse is an open, persistent, interactive, real-time virtual world that can be built using Web3 technologies	University of Cambridge. URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf
A metaverse is a large-scale and interoperable network of three-dimensional virtual worlds visualised in real time, which can be viewed synchronously and continuously by a virtually unlimited number of users with an individual sense of presence and continuity of data	MattewBall.vc. URL: https://www.matthewball.vc/all/forwardtothemetaverseprimer
A metaverseis a shared digital and online space populated by digital doubles (avatars) of people, places and things that interact in real time using 3D graphics	Roberto Moro Visconti [2, p. 1]
The metaverse is a future permanent and interconnected virtual environment in which social and economic elements reflect reality. Users can interact with it and each other simultaneously on devices and through immersive technologies when dealing with digital assets and property	World Economic Forum. URL: https://initiatives.weforum.org/defining-and-building-the-metaverse
The metaverse is a virtual environment that combines the physical and digital through the convergence of internet and web technologies and augmented reality	Lik-Hang Lee, Tristan Braud, Pengyuan Zhou, Lin Wang, Dianlei Xu, Zijun Lin, Abhishek Kumar, Carlos Bermejo, Pan Hui [3, p. 1]

Source: compiled by the author.

metaverse resembles the transition from Web1.0 to Web2.0, being, in fact, a new stage of the Internet development, which combines digital and physical life. Its pace, however, depends both on overcoming current technological limitations and on the quality of the user experience.[3]

Internet technologies have evolved rapidly over the past decades. Each stage in the development of the Internet has its own characteristics and simultaneously transforms the format of interaction between society and technology corporations, the ICT infrastructure, and the degree of control over the network (*Table 3*). The Web 1.0 internet (1990–2004) was based on open, decentralised protocols that were community-driven and presented information in a static form. In the Web 2.0 era (2005–2020), social networks are emerging, the number of users increases significantly with low or no distribution costs, and large IT corporations receive most of the revenue.

We are now at the beginning of the Web3 era, which combines the decentralised, community-driven world of Web 1.0 with the

[3] Ibidem, p. 5.

Table 3

Comparative characteristics of Web 1.0, Web 2.0 and Web3

		Web 1.0	Web 2.0	Web 3.0
	Organisational structure	Decentralised ownership. Participants interacted through basic protocols that were loosely regulated. Content was read-only and wholly owned by the creators, with no social interaction between participants	Centralised namespace management — Internet Corporation for Assigned Names and Numbers (ICANN). Members interact using highly standardised protocols managed by international organisations. Communities mainly create content and interact using technology platforms owned by major organisations and IT corporations	The community is usually managed through a decentralised autonomous organisation (hereinafter referred to as DAO) fund. Native tokens are issued. Decisions are made based on the consensus of the users. Community participants can include actors controlled by artificial intelligence
Platform characteristics/ network types	Data repository	None (data is stored decentrally in local formats)	Centralised (cloud storage managed by major IT corporations). Communities are mainly managed by elected leaders	Decentralised (local and cloud-based storage, managed by a large number of participants)
	Platform/ network format	PC Local networks	PC/Console. Virtual / augmented reality equipment. Mobile/desktop applications (Mobile/app)	PC/Console. Virtual / augmented reality equipment. Mobile/desktop applications are being developed (Mobile/app)
	Payment infrastructure	Electronic payments using real bank cards	Electronic payments using real and virtual bank cards. Specialised e-wallets. Local loyalty programme wallets	Cryptocurrency wallets
	Ownership of digital assets	The legal framework for digital assets is just emerging	Purchased for personal use or rented within the platform	Belongs to community members through NFT
	Digital asset portability	The legal framework for digital assets is just emerging	Locked inside the platform	Transmitted
Interaction with users	Content creators	Developers and website owners	Platform users and customers. Game studios and/or developers	Community. Game studios and/or developers. Artificial intelligence, including: virtual replicas of real people, fully virtual personalities, AI-controlled non-playable characters (NPCs) and robots
	Activities	Reading static text content. Commenting in guest books on websites	Socialisation. Multiplayer games. Streaming games. Competitive games (e.g. cyber sports)	"Play to Earn" Experience. The same actions as in Web 2.0

Table 3 (continued)

		Web 1.0	Web 2.0	Web 3.0
	Identification of the individual	Not available, user can name themselves arbitrarily for comments on each site (within Web 1.0 sites have guestbooks for comments, but the appearance of user accounts (profiles) on sites refers to Web 2.0)	Local authentication by email address or phone number, biometric authentication, platform avatar, cross-platform authentication capability	A self-contained and compatible identity. Anonymous identity based on a private key
	Payments	Electronic payments using bank cards	Electronic payments using bank cards, virtual wallets, loyalty points and discount coupons. Platform-based virtual currency	Cryptocurrencies and tokens
Revenues	Revenues from content	Mostly received by service providers	Shared between platform (app shop) and developers. Owners of platforms, search, sales, or super-applications receive revenue from content and advertising from B 2B clients (local sellers and advertisers). Financial corporations receive fees and commissions from all transactions and currency conversions	Developers (content creators) earn directly from sales. Users can earn through playing the game or participating in the management of the platform. Royalties to creators on the secondary market for NFT

Source: compiled by the author based on URL: https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf

advanced features of Web 2.0.[4] In practice, this process is supported by the transition from closed corporate Web 2.0 networks, which are owned and controlled by large IT corporations, to open Web3 crypto — networks, which are owned and controlled by the users.[5]

It should be noted that the terms 'metaverse' and 'Web3', periodically used interchangeably in practice, are not synonymous, although they are closely linked. Although Web3 encourages the development of a metaverse, in particular by supporting decentralisation, it is not inherently a metaverse, which can be either centralised or decentralised in terms of governance format.[6] The term "Web3" was introduced into the business world in 2014 by Ethereum co-founder G. Wood. He viewed it through the lens of a decentralised online ecosystem based on distributed technologies such as blockchain and DAO [4] rather than servers owned by individuals or corporations. Web3-based platforms and applications are not

[4] Navigating the Metaverse: A Guide to Limitless Possibilities in a Web 3.0 World. Wiley, 1st Edition. 2022.

[5] Grayscale. The Metaverse. Web 3.0. Virtual Cloud Economies. 2021. C. 7. URL: https://www.digitalcapitalmanagement.com.au/wp-content/uploads/2022/02/Grayscale_Metaverse_Report_Nov2021.pdf (accessed on: 08.08.2022).

[6] McKinsey & Company. Value Creation in the metaverse. 2022. URL: https://www.mckinsey.com/~/media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf (accessed on: 09.07.2022).

Table 4

Rules for the metaverse constructing

No.	Rules	The essence of the rules
1	There is only one metaverse*	Metaverse is the sum of all publicly accessible virtual worlds, real-time 3D content and related media, connected to an open global network, uncontrolled and accessible to all
2	Metaverse is for everyone	Metaverse is for everyone, with political and socio-economic implications
3	No one controls the metaverse	Metaverse is run in the common interest and for the greatest good of as many people as possible
4	Metaverse is open	Metaverse is built on compatible technologies and tools, connected by strictly defined and widely agreed upon free and open communication standards
5	Metaverse is hardware-independent	Metaverse is hardware-independent and available on any device, regardless of display type and form factor
6	Metaverse is a network	Metaverse is a computer network of publicly accessible virtual worlds, real-time 3D content and related media
7	Metaverse is the internet	Metaverse is an improved and modernised Internet for consistent delivery of 3D content, spatially organised information and experiences, and real-time synchronous communication

Source: URL: https://medium.com/meta-verses/the-seven-rules-of-the-metaverse-7d4e06fa864c

* *Note:* John Garon believes that in the future there will be not a single metaverse, but a multiverse, which is a free confederation of separate virtual worlds with its own set of management tools. URL: http://dx.doi.org/10.2139/ssrn.4002551

owned by a central authority, but by users who get their share in ownership and greater control over their own data by helping to develop and maintain these services.[7] According to Cambridge University experts, Web3 refers to the next generation of technical, legal and payment infrastructure, including blockchain, smart contracts [5] and cryptocurrencies.[8]

Most Web3 projects currently in existence could fall into one of three categories: decentralised blockchain-based finance, decentralised digital service delivery, virtual collectibles.[9] Accenture's 2022 "Digital Health Vision Concept" report states that Web3 will enable the movement of data along with the individual, who will be present in a metaverse with digital content rather than a platform.[10] In essence, the Web3 is an Internet owned by developers and users who interact with each other without intermediaries (as opposed to Web 2.0.) using digital tokens.

The transition to Web3, which is based on the Web 2.0 infrastructure, is expected to be costly and gradual. Such a massive undertaking implies a dramatic change in the economy and active cross-industry work on a wide range of issues.

[7] Wired. The Father of Web3 Wants You to Trust Less. 2021. URL: https://www.wired.com/story/web3-gavin-wood-interview/ (accessed on: 09.07.2022). P. 13.

[8] University of Cambridge. Policy Brief. Crepro, web3, and the Metaverse. 2022. P. 5. URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf (accessed on: 09.07.2022).

[9] URL: https://www.bennettinstitute.cam.ac.uk/wp-content/uploads/2022/03/Policy-brief-Crypto-web3-and-the-metaverse.pdf (accessed on: 09.07.2022).

[10] Accenture. Accenture Digital Health Technology Vision 2022. Meet Me in the Metaverse. How the continuum of technology and experience is reshaping healthcare. 2022. P. 4. URL: https://www.accenture.com/_acnmedia/PDF-178/Accenture-Digital-Health-Technology-Vision-2022.pdf#zoom=40 (accessed on: 09.07.2022).

KEY ELEMENTS OF THE METAVERSE

At the moment, technologies that would allow millions of people to participate in a "shared synchronous experience" simultaneously,[11] do not exist or are very fragmented in terms of their long-term use. Currently, technologies that would allow millions of people to participate in simultaneous synchronous experiences are either not available or very fragmented in terms of their use in the long term. The current debate on the concept is therefore primarily about forecasting its development so that it can compete with the real economy in the future.

Investor T. Parisi has formulated seven rules of the metaverse that reflect one approach to its construction and can be taken into account when developing a strategy in this area (*Table 4*).

Continuing this discussion, K. Nabben identifies two opposing approaches to the development of the metaverse. According to the first, large corporations will determine people's behaviour on their own, creating private virtual worlds in which value is extracted from users as consumers. The other approach assumes a decentralized technological architecture (e.g. based on blockchain technologies) in which DAOs [6] create their own worlds and distributed communities collectively own and manage assets in digital worlds (public virtual worlds) [7, p. 1]. In this context, D. Vidal-Thomas notes that if the IT giants create their private virtual worlds with a working virtual economy that can be based on fiat currencies and traditional trade, it will be very difficult to compete with them [8, p. 25]. In any case, given the fact that people are spending more and more time in virtual environments, it is crucial to understand who will create and control them. In this regard, Jules F. Verne rightly brings issues of trust to the forefront in such environment [10].

The literature identifies eight key elements that contribute to the creation and development of a metaverse (*Table 5*).

McKinsey, in its turn, includes four main building blocks in the structure of the metaverse, the process of its development largely depends on the improvement of their compatibility: content and expertise, platforms, infrastructure and hardware, means of implementation (*Table 6*). Note that this approach is only an assumed structure of the metaverse, which will not necessarily be presented in this form in practice, given the speed of ICT development and the rapid digital transformation of society and the state.

Thus, it is clear that visions of possible models for the creation and development of a metaverse are now emerging, for which an appropriate level of technological development, infrastructure and content will be required in the medium term, drawing on customer experience.

PROSPECTS FOR THE METAVERSE

While research and consulting firm Gartner (US) lists metaverse as one of the top five trends and technologies of 2022, there is an assumption that it is not likely to completely replace current digital interactions (e.g., through apps), but it is likely to facilitate new types of connections and business models, fundamentally changing the way both people and corporations communicate with each other and with the outside world,[12] and stimulating new products and services. In addition, the development of virtual societies and networks may extend beyond the boundaries of a single state to address inter-state interactions.

In this regard, it should be noted that the creation of a metaverse implies the emergence

[11] URL: https://www.matthewball.vc/all/forwardtothemetaverseprimer (accessed on: 11.07.2022).

[12] Impactful technologies from the Gartner Emerging Technologies and Trends Impact Radar for 2022. 2021. URL: https://www.gartner.com/en/articles/5-impactful-technologies-from-the-gartner-emerging-technologies-and-trends-impact-radar-for-2022 (accessed on: 11.08.2022).

Table 5

Key elements of the Metaverse

Key elements	Functions
Computational capacity	Providing computing capacity to support the metaverse (physical computing, data matching and synchronisation, artificial intelligence, etc.)
Networking	Providing real-time, high-bandwidth, continuous connectivity, and decentralised data services to consumers
Virtual platforms	Development and operation of immersive digital and three-dimensional simulations, environments and worlds in which users and corporations can explore, create, communicate, and participate in various activities and economic activities
Exchange tools and standards	Creation of tools, protocols, formats, services, and mechanisms that act as de facto (or de facto interoperability) standards and enable the creation, operation, and improvement of the metaverse
Payment transactions	Support for digital payment processes and transactions, including financial services and the exchange of fiat currency for digital currency
Content, assets, and identification services	Creating, selling, reselling, storing, securely protecting and financially managing digital assets, such as virtual commodities and currencies, linked to user data and identity
Hardware	Sale and support of physical technology and devices used to access, interact with, or develop the metaverse
User behaviour	Observation of changes in consumer and business behaviour (including spending and investment, time and attention, decision-making and opportunity) that are either directly related to, or otherwise contribute to, the metaverse or reflect its principles and philosophy

Source: URL: https://www.roundhillinvestments.com/assets/pdfs/METV_Deck.pdf; https://www.matthewball.vc/all/forwardtothemetaverseprimer

of relevant risks that should be taken into account when assessing this area of activity and building a risk management system in the corporation. These may include the issues of legal regulation, security, data privacy, identity, ethics, distribution of destructive content, copyright and biometric data protection, antimonopoly regulation, professional retraining of specialists and users, impact of ICT on human health, environmental pollution, creation of fake avatars, etc.[13] [11–13]. Given the scale of projected transformations, some authors do not exclude that gradually the concept of metaverse may turn into a "metacurse" [14].

F. Yu. Wang et al. emphasize that, at the moment, the "meta-economy" functions in parallel with the real economic system [15, p. 4]. D. Vidal-Thomas, for his part, points out that it is characterized by speculative cryptocurrency tokens and is run by traders who provide explosive growth through speculative trading, rather than meta-users who are genuinely interested in immersive experiences. For this reason, the metaverse in its current state is seen by the economist as "a speculative digital world that should be avoided by meta-users who are looking for a pleasurable immersive experience without speculative goals" [8]. This thesis can be traced back to the dramatic fluctuations in the value of virtual real estate [16]. According to digital real estate platform operator WeMeta, trade in virtual land on six platforms, including Decentraland and The Sandbox, was down

[13] World Economic Forum. Even though it's virtual, the metaverse does actually impact the environment. 2022. URL: https://www.weforum.org/agenda/2022/02/how-metaverse-actually-impacts-the-environment/ (accessed on: 11.08.2022).

Table 6

Structure of the Metaverse

Unit		Unit levels	
Content and experience	Content: enriches the metaverse experience, including content from the developer, creator, users, etc.	Applications: tied to specific uses of the metaverse (training, collaborative work, activities, etc.)	Virtual worlds: environments in which large numbers of users can collect, interact, create, and move different events
Platforms	Access and discovery: platforms that facilitate the distribution and discovery of content, experiences, apps, including browsers, search/ visual search, app shops, app showcases	3D authoring platforms: a core set of tools and platforms for creating 3D applications, including design, game engines, AI services, authoring tools	
Infrastructure and hardware	Devices, OS, and accessories: device hardware, components, accessories/peripherals, and OS layers that are part of the human interface	Infrastructure: underlying infrastructure in the cloud, semiconductors, networks, etc. that keep the metaverse running	
Means of implementation	Security, privacy, and governance: security, identity and data management platforms, content moderation	Identification: platforms that manage digital authentication, avatars, and social graphs	Payments and monetisation: platforms and tools (e.g., advertising) to create a metaverse economy

Source: URL: https://www.mckinsey.com/business-functions/growth-marketing-and-sales/our-insights/value-creation-in-the-metaverse

97% in June 2022 from its November peak ($ 8 million and $ 229 million respectively).[14] In this context, in order to better understand the role of the metaverse concept in the life of society and state, it seems reasonable to assess the prospects for its evolution from different perspectives and over different time horizons.

Given the high speed of the digital transformation of the economy, it seems critical to gauge public attitudes towards the concept of the metaverse. Thus, according to a survey of 1,007 respondents conducted by the Tidio blog, among the main reasons to join the metaverse are work opportunities (52%), art and live entertainment "on air" (48%), and monetary investments (NFT[15] and cryptocurrency trading) (44%). At the same time, almost 77% of respondents believe that the metaverse could cause serious harm to modern society. Addiction to simulated reality (47%), privacy issues (41%) and mental health (41%) are cited as major threats. However, almost 46% are convinced that 10 years after the creation of the metaverse, mostly humans will be living and coexisting in it.[16]

D. Garon points out that an important factor influencing the development of the metaverse is the emergence of a generation that has grown up in the virtual world [9, p. 3]. According to Pew Research Center's online survey of 1,316 American teenagers, aged 13 to 17, the vast majority of them have access to digital devices such as smart phones (95%), desktop or laptop computers (90%) and games consoles (80%). The number of daily internet users among respondents has increased from 92% in 2014–2015 to 97% currently. The proportion of teenagers who say they are almost constantly online has doubled since 2014–2015 (from 24% to 46%). In addition, the proportion of respondents who say they use the internet almost all the time has also increased (from

[14] TheRealDeal. Metaverse land prices down 80% in six months. 2022. URL: https://therealdeal.com/2022/08/04/metaverse-real-estate-gets-reality-check/ (accessed on: 15.08.2022).

[15] NFTs play a big role in drawing attention to metaverse. For example, Nike acquired startup RTFKT, which produces unique virtual trainers and digital artefacts using NFT, blockchain-based authentication and augmented reality. URL: https://www.techtarget.com/whatis/feature/The-metaverse-explained-Everything-you-need-to-know (accessed on: 15.08.2022).

[16] Tidio. Metaverse: Would You Remain Yourself in a Virtual World? 2022. URL: https://www.tidio.com/blog/metaverse/ (accessed on: 15.08.2022).

24% to 46%). YouTube is the most popular social platform among respondents (95%), followed by TikTok (67%), Instagram (62%) and Snapchat (59%). Note that there has been a sharp decline in the use of Facebook (32%, down from 71% in 2014–2015).[17]

The RuGenerations research centre in 2021, based on a study conducted in the format of online group interviews with young people of the borderline Y, Z generations (born in 1999–2005) from Russia and Kazakhstan, concluded that they have the following characteristics:

- content and switching between different content is more important than its duration;
- the choice of content depends largely on the recommendations they trust;
- live streaming is popular with them;
- voluntary donations to content creators are widespread;
- viewing content is often combined with the consumption of food.[18]

It seems crucial for states and organizations to take these characteristics into account when designing and implementing their development strategies.

In this context, it seems logical to develop new user interfaces that change the format of communication and make access to information increasingly barrier-free (e.g., through the creation of neural interfaces). The strategic goal is to enable the seamless movement of people and assets between the metaverse and the physical world, potentially only possible through close interaction between corporations operating in the virtual and physical worlds. This approach implies enormous economic potential, which could not only facilitate the creation of new corporations, products, and services, but also change the way resources are allocated and monetised.

CONCLUSIONS AND RECOMMENDATIONS

At present, the metaverse concept is at the nascent stage and is significantly influenced by various factors (quality of research, ICT development, regulatory frameworks, customer experience, etc.). Its creation and establishment will require significant improvement of the existing infrastructure, scaling of technological development and computing power, creation of new user experience and development of standards for metaverse management.[19]

Given the high level of uncertainty and the scale of change to come, such a process is a multifaceted task. Therefore, for strategic development and identification of potential risks, corporations are advised to:

1. Review the specifics of developing virtual worlds in the context of the corporation's business strategy and business model at the board of directors' level.
2. Identify potential areas of corporate development in virtual worlds and platforms for collaboration.
3. Identify and rank the risks of the corporation in the virtual space.
4. Evaluate the economic feasibility of participating in projects in the virtual environment and their relationship to the physical world.
5. Increase the level of competencies and skills of the corporation's employees in the digital economy.

The development potential of the metaverse allows an infinite number of parallel worlds to be created simultaneously, radically

[17] Pew Research Center. Teens, social Media and Technology 2022. 2022. URL: https://www.pewresearch.org/internet/2022/08/10/teens-social-media-and-technology-2022/ (accessed on: 15.08.2022).

[18] Rugenerations. Generation Z: Streaming, donation and clipboard thinking 2021. URL: https://rugenerations.su/2021/1-2/02/%d0%bf%d0%be%d0%ba%d0%be%d0%bb%d0%b5%d0%bd%d0%b8%d0%b5-z-%d1%81%d1%82%d1%80%d0%b8%d0%bc-%d0%b4%d0%be%d0%bd%d0%b0%d1%82-%d0%b8-%d0%ba%d0%bb%d0%b8%d0%bf%d0%be%d0%b2%d0%be%d0%b5-%d0%bc%d1%8b%d1%88/ (accessed on: 15.08.2022)

[19] The creation of the Metaverse Standards Forum to develop the interoperability standards needed to create an open metaverse can be seen as an important step in this direction. URL: https://metaverse-standards.org/ (accessed on: 15.08.2022).

transforming our everyday lives. In this regard, their progressive emergence can go in different directions, and the forecasts should only be considered as potential vectors of development of this market segment. It seems that in the medium-term evolution in this area will follow the path of creation of separate virtual worlds by large technological corporations and states,[20] which at some stage will have to cooperate with each other and ensure compatibility of systems and technologies in order to form a single metaverse or multiverse based on a hybrid governance model combining both centralized and decentralized approaches.

CONCLUSIONS AND RECOMMENDATIONS

At present, the metaverse concept is at the nascent stage and is significantly influenced by various factors (quality of research, ICT development, regulatory frameworks, customer experience, etc.). Its creation and establishment will require significant improvement of the existing infrastructure, scaling of technological development and computing power, creation of new user experience and development of standards for metaverse management.[21]

Given the high level of uncertainty and the scale of change to come, such a process is a multifaceted task. Therefore, for strategic development and identification of potential risks, corporations are advised to:

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The development potential of the metaverse allows an infinite number of parallel worlds to be created simultaneously, radically transforming our everyday lives. In this regard, their progressive emergence can go in different directions, and the forecasts should only be considered as potential vectors of development of this market segment. It seems that in the medium-term evolution in this area will follow the path of creation of separate virtual worlds by large technological corporations and states,[22] which at some stage will have to cooperate with each other and ensure compatibility of systems and technologies in order to form a single metaverse or multiverse based on a hybrid governance model combining both centralized and decentralized approaches.

[20] In February 2022, the South Korean government announced $ 187 million in funding for the national project to create an "Expanded Virtual World" metaverse ecosystem. URL: https://cointelegraph.com/news/south-korea-to-invest-187m-in-national-metaverse (accessed on: 15.08.2022).

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ABOUT THE AUTHOR

Aleksandr S. Yukhno — Cand. Sci. (Jur.), Member of the Expert Council on Corporate Governance of Companies with State Share of the Institute of Economics of the RAS, Deputy Chairman of the Public Council under the Federal Agency for State Property Management, Moscow, Russia
http://orcid.org/0000-0003-2999-2982
as.yukhno@mail.ru

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